

# OPTIMIZATION PROBLEM FORMULATION AND SOLUTION TECHNIQUES

## 5.1 Introduction

There are many cases in practical applications where the variables of optimization are not continuous. Some or all of the variables must be selected from a list of integer or discrete values. For example, structural members may have to be designed using sections available in standard sizes; member-cross-sectional dimensions may have to be selected from the commercially available ones. Therefore, considerable interest was shown for discrete variable engineering optimization problems since the late 1960s and early 1970s. However, at that time even optimization methods for simpler continuous nonlinear programming (NLP) problems were still in the process of development. In the 1970s and 80s, a major effort was put into development and evaluation of such algorithms. Although research in this area continues to develop better methods, especially for large scale problems, several reliable algorithms are now available for NLP problems, including sequential quadratic programming (SQP) and augmented Lagrangian methods. In recent years, the focus has shifted back to

# Optimization Problem Formulation And Solution Techniques

**Ying Liu**



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